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Ludwig Steinhauser

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EXAMINER

LIN, KUANG Y

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/540,226
Filing Date: December 27, 2005
Appellant(s): STEINHAUSER, LUDWIG

Clifford A. Ulrich
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 15, 2008 and June 17, 2008 appealing from the Office action mailed August 29, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Applicant's admitted prior art as set forth in pages 1-3 of the specification

4,589,478	Wunder	5-1986
5,600,950	Ottenschlaeger	2-1997

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

It was noted that in the final rejection the examiner inadvertently omitted “applicant’s admitted prior art as set forth in pages 1-3 of the specification” from the rejection headings for claims 10 and 16. However, it is self-evident that the rejection should have included “applicant’s admitted prior art” in view of the fact that both claims 10 and 16 depend from claim 9 and the admitted prior art was used, along with other references, for the rejection to claim 9.

1. Claims 9, 11-15, 17-21 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant’s admitted prior art as set forth in pages 1-3 of the specification and further in view of either US 4,321,010 to Wilkinson et al., US 4,589,478 to Wunder, or US 5,600,950 to Ottenschlaeger and further in view of US 5,299,619 to Chandley et al.

The applicant’s admitted prior art shows (see, for example, page 2, line 8 through page 3, line 25 of the specification) to manufacture the half-tubes for the heat exchanger through steps of forging and welding. The openings in the surface of the half-tubes are formed by EDM after the half-tubes are manufactured. The admitted prior art further stated that using EDM for forming opening in tubes or half-tubes involves high cost and the problem of forming recast layer. In short,

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the admitted prior art substantially shows the claimed invention except that it does not show to manufacture the heat exchange tubes through the conventional investment casting process. However, each of the secondary references shows to form openings in the tube surface *in situ* as the tube is investment cast. It is apparent to those of ordinary skill in the casting art that when the conventional investment casting process is used for forming openings in tube or half-tube there is no need to using additional EDM step for forming the openings. In view of the prior art teaching as a whole, It would have been obvious to use the investment casting technique of the secondary references for manufacturing the half-tubes of the admitted prior with the openings formed *in situ* such that to simplify the heat exchanger making process and to reduce the manufacturing cost. With respect to the step of applying either a vacuum or under inert gas during casting step, Chandley et al. show to provide an insert gas atmosphere during casting step such that to prevent the oxidation of the casting. It would have been obvious to provide the inert gas of Chandley et al. in the casting process of the secondary references in view of the advantage.

2. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art as set forth in pages 1-3 of the specification in view of either US 4,321,010 to Wilkinson et al., US 4,589,478 to Wunder, or US 5,600,950 to Ottenschlaeger and further in view of US 5,299,619 to Chandley et al. as applied to claim 9 above, and further in view of US 4,223,716 to Ostrowski.

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It would have been obvious to perform the dewax step in an autoclave in view of Ostrowske who shows that feature to be conventional.

3. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art as set forth in pages 1-3 of the specification in view of either US 4,321,010 to Wilkinson et al., US 4,589,478 to Wunder, or US 5,600,950 to Ottenschlaeger and further in view of US 5,299,619 to Chandley et al. as applied to claim 9 above, and further in view of US 3,895,672 to King, Jr. et al.

It would have been obvious to preheat shell mold prior to pouring of molten metal to prevent molten metal from premature solidification in view of King, Jr. et al. who show that feature to be conventional.

(10) Response to Argument

a. Appellant states in page 2, line 30 through page 3, line 14 of the specification that in addition to the high cost the conventional EDM process has a disadvantage of forming recast layers during opening producing process for the half tube. These layers have to be removed before the high-temperature soldering to be carried out. When there is a need or market pressure to solve the problems (to simplify the process and to reduce the processing cost) and there are a finite number of identified, predictable solution (casting methods), a person of ordinary skill has good reason to pursue the known option (investment casting process), *KSR international Co. v. Teleflex Inc.*, 82 USPQ 2d 1385. Since each of the secondary references shows to form openings *in situ* with the

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conventional investment casting technique without using additional EDM step, It would have been obvious to use the conventional investment casting process, as taught by the secondary references, to cast the half tube of the admitted prior art with openings formed *in situ* such that to simplify the heat exchanger making process and to reduce the manufacturing cost.

b. Appellant in page 4, last paragraph, of the appeal brief stated that Wilkinson et al. do not deal with the problem of having to provide myriad openings in a forged part. However, the admitted prior art show the problem when forming the half-tube by using the mechanical process. Since Wilkinson et al. show to form a plurality of small apertures in a tube (col. 1, lines 8-17) by using a lost wax process (col. 1, lines 55-56), (the lost wax process is known as investment casting process) it would have been obvious to form the half-tube of the admitted prior art with the investment casting process of Wilkinson et al. to simplify the process and to reduce the manufacturing cost. Appellant further stated that in Wilkinson et al., the cross section of the cooling air entry tube only shows 15 holes. However, these figures are simplified drawings. There are a large number of holes and passages in a turbine blade for passing air to cooling the same. Appellant also stated that in Wilkinson et al. no tubes are being soldered to these holes. It is noted that an entire designated product can be produced with investment casting process without using intermediate soldering step(s). It would have been obvious that the entire heat exchanger (not just the half-tube) of the admitted prior art can be produced through investment casting

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process without using soldering step if one wants to. Thus, to form the heat exchanger with or without the stated soldered step is nothing more than an obvious matter of design choice.

c. Appellant in page 5, 2nd para. of the appeal brief stated that Wunder does not disclose to form shell body with investment casting process and that the shell body 10 of Wunder includes projecting bosses (26, 27), the housing for by pass valve (36), and the flange (12), but does not include a plurality of opening.

However, the shell body (10) of Wunder formed through investment casting process (col. 2, last para.) has apertures 28, 29, opening 35, passages 32, 38 (col. 3, lines 1-22). Thus, it would have been obvious to form the half-tube of the admitted prior art with the investment casting process of Wunder to simplify the process and to reduce the manufacturing cost.

d. Appellant in page 5, 3rd para. of the appeal brief stated that Ottenschlaeger has a low number of opening (4) in each segment (5) and he does not disclose to form claimed tubes or half-tubes having a plurality of openings. However, Ottenschlaeger does show the concept of using investment casting technique without using machining step for forming openings. It would have been obvious to those of ordinary skill in the art that large number of openings in a tube can also be formed in the investment casting process without using an additional machining step. Thus, it would have been obvious to form the tube or the half-tube of the admitted prior art with the investment casting process of Wunder to simplify the process and to reduce the manufacturing cost.

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e. With respect to appellant's argument to claims 10 and 16, Chandley et al. and King Jr. et al., respectively were cited simply to show that it is conventional to use an autoclave to perform dewaxing step to facilitate the dewaxing process and to preheat shell mold to prevent premature solidification of molten metal in an investment casting process. All other features are shown by the combined teaching of the admitted prior art and the secondary references.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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